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Pesticide Fact Sheet Number 113
Sodium Arsenite

(U.S.) Environmental Protection Agency
Washington, DC

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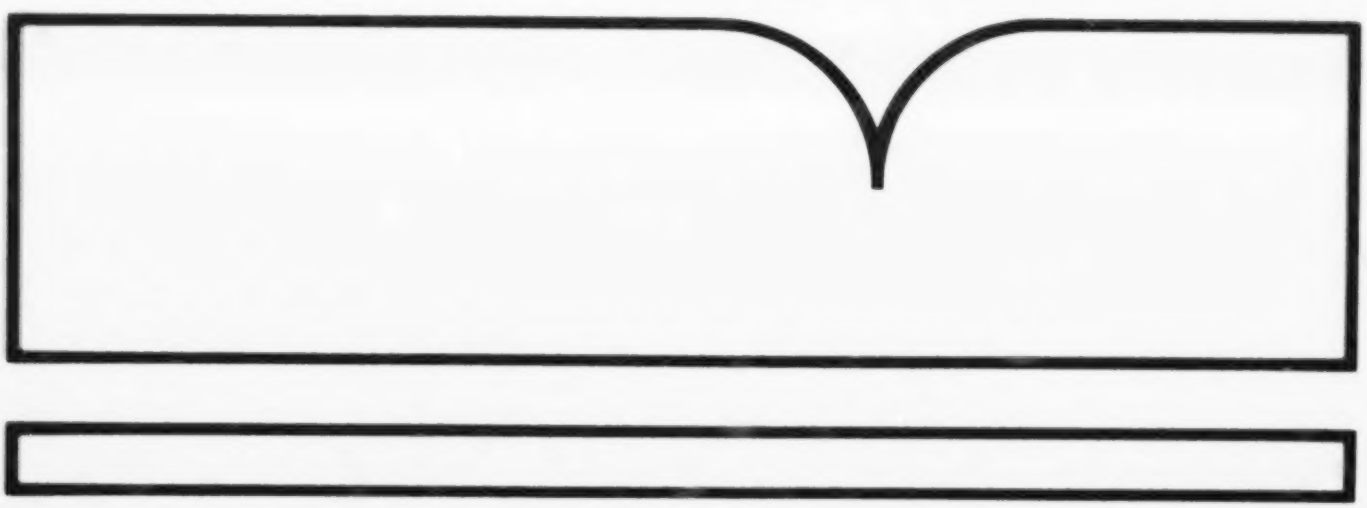

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16. Abstract (Limit: words)

The document contains up-to-date technical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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United States
Environmental Protection
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Office of Pesticides and Toxic Substances
Office of Pesticide Programs (TS-766C)
Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: Sodium arsenite
Reason for Issuance: Special review
Date Issued: December 1986
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1. DESCRIPTION OF CHEMICAL

Common Name: Sodium Arsenite

Chemical Name: Sodium Metaarsenite - $NaAsO_2$

Trade Names: Chem Pels C, Chem-Sen 56, Kill-All, Penite Prodalumnol Double

EPA Shaughnessy Code: 013603

Chemical Abstracts Service (CAS) Number: 77784-46-5

Year of Initial Registration:

Pesticide Type: Acaricide, Fungicide, Herbicide, Insecticide, Termiticide

Chemical Family: Inorganic Arsenicals

U.S. and Foreign Producers: Agtrol Chemicals, Fasey & Besthoff, Inc.

2. USE PATTERNS AND FORMULATIONS

Sodium arsenite is used as a broad spectrum herbicide for weed control in industrial areas, lots and tank farms. However, this use has been declining in recent years. Sodium arsenite is also used as a fungicide in California to control black measles, phomopsis shoot, and leaf necrosis on 5% of the U.S. grape crop. There is currently no known usage of sodium arsenite as an acaricide, insecticide, or termiticide.

- Types and Methods of Application: Wind spray machine, hand application equipment, injection, dip, and liquid bait.

- Application Rates: Fungicide - 1.5 lbs arsenic/A
  Herbicide - 3.0 lbs ai/A

Types of Formulations: Flowable liquid, soluble concentrate, wettable powder/dust

3. SCIENCE FINDINGS

° Chemical Characteristics

Sodium arsenite is a trivalent form of inorganic arsenic. It normally exists as a gray-white powder with no discernible odor. Sodium arsenite contains 58% arsenic and is very soluble in water and alcohol. The boiling point of sodium arsenite is 100°C, the density is 1.87 and the molecular weight is 129.91. Sodium arsenite is a highly toxic substance with an acute oral LD_{50} (mammalian) of 10-50 mg/kg.

° Toxicological Characteristics

Inorganic arsenical compounds have been classified as Class A oncogens, demonstrating positive oncogenic effects based on sufficient human epidemiological evidence.

Inorganic arsenicals have been assayed for mutagenic activity in a variety of test systems ranging from bacterial cells to peripheral lymphocytes from humans exposed to arsenic. The weight of evidence indicates that inorganic arsenical compounds are mutagenic.

Evidence exists indicating that there is teratogenic and fetotoxic potential based on intravenous and intraperitoneal routes of exposure; however, evidence by the oral route is insufficient to confirm sodium arsenite's teratogenic and fetotoxic effects.

Inorganic arsenicals are known to be acutely toxic. The symptoms which follow oral exposure include severe gastrointestinal damage resulting in vomiting and diarrhea, and general vascular collapse leading to shock, coma and death. Muscular cramps, facial edema, and cardiovascular reactions are also known to occur following oral exposure to arsenic.

° Environmental Characteristics: The environmental fate of sodium arsenite is not well documented. However, because of its extreme toxicity and its solubility in soil moisture and hence the hazard to water supplies, sodium arsenite is not used now for many purposes formerly common practice. Studies to demonstrate its fate must take into account the fact that inorganic arsenicals are natural constituents of the soil, and that forms of inorganic arsenic may change depending on environmental conditions.

° Ecological Characteristics: Sodium arsenite is toxic to birds, fish and aquatic invertebrate species.

- Metabolism: The metabolism of inorganic arsenic compounds in animals is well known. The pentavalent form is metabolized by reduction into the trivalent form, followed by transformation into organic forms which are excreted within several days via the urine. All animals exhibit this metabolism except rats, which retain arsenic in their bodies for up to 90 days.

- Tolerance Assessment: Tolerances were established in 40 CFR 180.335 for residues of the insecticide sodium arsenite (expressed as As_2O_3) resulting from dermal application to animals under the supervision of the U.S. Department of Agriculture. An interim tolerance of 0.05 ppm (as As_2O_3) for grapes was established in 40 CFR 180.319.

- Reported Pesticide Incidents: The Agency's Pesticide Incident Monitoring System (PIMS) has many recorded incidents of accidental poisonings from the use of sodium arsenite. From 1966 to 1979, sixty-one reports involving humans were reported. Eleven of these incidents involved hospitalizations and 24 involved child or adult fatalities.

4. SUMMARY OF REGULATORY POSITION AND RATIONALE

The Agency is proposing to cancel all existing nonwood registrations of sodium arsenite, with the exception of the fungicidal use on grapes. Measures to mitigate the inhalation risks including dust masks, respirators, which would be expected to reduce inhalation exposure by 80 and 90 percent, respectively, and restricting the use to certified applicators were considered by the Agency during the Special Review. The Agency has determined that these protective measures would not reduce risks to an acceptable level in light of the limited benefits. The Agency has further determined that the toxicological risks from all nonwood uses of sodium arsenite, except for the use on grapes, outweigh the limited benefits. The fungicide use on grapes is being deferred pending further evaluation by EPA's Risk Assesment Forum of the carcinogenic potency of inorganic arsenic from dermal and dietary exposure.

- Benefits Analysis: No economic impact is expected as a result of cancellation of the herbicide and insecticide registrations of sodium arsenite.

5. CONTACT PERSON

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